Accompanying

Statement

CANADIAN NUCLEAR SAFETY COMMISSION

REQUEST TO PROTECT CONFIDENTIAL INFORMATION

ACCOMPANYING SUBMISSION

CANADA

PROVINCE OF **ONTARIO**

IN THE MATTER OF **Ontario Power Generation (OPG) Request to Submit OPG Confidential – DNNP – Submission Package #6(b) Construction and Commissioning Program Confidential Deliverables in Support of the Licence to Construct Application for the CNSC Review**

I, **Mark Knutson located at 889 Brock Road, P82-5A1, Pickering, Ontario, L1W 3J2**, an authorized senior officer of **Ontario Power Generation Inc.**

DO SUBMIT THAT, WITH RESPECT OF THE APPLICATION BY (**Ontario Power Generation Inc.**) REGARDING AN APPLICATION FOR **ISSUANCE** OF A LICENCE FOR (**Darlington New Nuclear Project (Licence to Construct Application)**, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF:

1. **Ontario Power Generation Inc.** wishes to have protected / restricted / prohibited from public disclosure the following document (attached):

- **"DNNP – Submission Package #6(b) Construction and Commissioning Program Confidential Deliverables in Support of the Licence to Construct Application for the CNSC Review", NK054-**

2. I understand that the Commission may deem all documents in support of the licence or certification application as releasable to the public, unless the document is accompanied by an accompanying submission signed by a senior officer seeking to protect / restrict / prohibit the document from public disclosure.

3. The information contained in the above-referred document(s) should be protected / restricted / prohibited pursuant to paragraph (refer to appropriate provisions of Rule 12 of CNSC Rules of Procedure) for the following reasons:

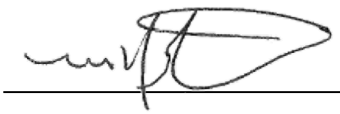
In accordance with Commission Rules of Procedure: Confidentiality, Section 12 (1) b: OPG requests that the above mentioned submissions be protected from public disclosure. The OPG's Darlington New Nuclear Project (DNNP) Licence to Construct design information and supporting assessments, contained and referenced in these submissions, is confidential information of a financial, commercial, scientific, and technical nature that is treated consistently as confidential and the vendor partners affected has not consented to the public disclosure.

4. The information sought to be protected / restricted / prohibited is being provided to the CNSC in confidence, and is to be received in confidence by the CNSC.

5. The information sought to be protected / restricted / prohibited is not available in public sources, to the best of my knowledge and belief.

For all the reasons discussed above, **Ontario Power Generation Inc.** requests that the identified confidential information be protected / restricted / prohibited from public disclosure.

Within documents accompanied by an accompanying submission where only part of the documentation is deemed sensitive, the information deemed as sensitive shall be clearly identified to distinguish it from information within a document where the remaining information is non-sensitive.



Mark Knutson

Mar 28, 2023

Senior Vice President
Chief Enterprise Engineering and Chief Nuclear Engineer
Ontario Power Generation Inc.

Date

Signed in **Pickering** in the **Regional Municipality of Durham** in the Province of **Ontario** this **28** day of **February, 2023.**

SUMMARY OF N-REP-00962.2-00002 R000

CONVENTIONAL DISMANTLING COST ESTIMATE FOR THE DARLINGTON NEW NUCLEAR PROJECT AS-BUILT FACILITY

This cost estimate evaluates the as-built conventional dismantling of the Darlington New Nuclear Project (DNNP) prior to plant operations, not including the first fuel load. The estimate includes three periods, Preparation, Dismantling, and Site Restoration. The cost is based on several key assumptions, including regulatory requirements, estimating methodology, allowance requirements, and site restoration requirements.

Regulations

Regulatory Document REGDOC-1.1.2, "Licence Application Guide, Licence to Construct a Nuclear Power Plant," requires decommissioning practices to be addressed with the application for a License to Construct (LTC) a nuclear power plant. Two areas of decommissioning are considered. The first is "construction from a decommissioning perspective." The next consideration is "activities encompassed by the LTC: a preliminary decommissioning plan and financial guarantee that covers the scope of work and related costs to return the site from the conditions expected at the end of a licence to construct to an agreed-upon end state (including, if the project is halted, restoration of the site to the original condition)."

Guidance on nuclear station decommissioning preparation and planning in Canada is found in Regulatory Document REGDOC-2.11.2, "Decommissioning," promulgated by the Canadian Nuclear Safety Commission (CNSC). This guide requires licensees to "prepare a Preliminary Decommissioning Plan (PDP) and submit it to the CNSC for acceptance with an application for a licence in respect of a nuclear facility or the conduct of a licensed activity, in accordance with the conditions of its licence. The PDP shall document the selected decommissioning strategy; main decontamination, dismantling and/or clean-up activities; end-state objectives; an overview of the principal hazards and protection strategies; a waste management strategy; a cost estimate; and financial guarantee arrangements.'' Regulatory Document REGDOC 3.3.1, "Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities," provides guidance on developing a cost estimate to ensure there will be sufficient resources to safely decommission the station in accordance with the decommissioning plan.

Methodology

The methodology used to develop the decommissioning cost estimates follows the basic approach originally presented in the cost estimating guidelines developed by the Atomic Industrial Forum (now Nuclear Energy Institute). This reference describes a unit cost factor method for estimating decommissioning activity costs. The unit cost factors used in this cost estimate reflect site-specific costs and the latest available information about worker productivity in decommissioning, adjusted to remove work difficulty elements associated with radioactivity.

The experience gained in the Shippingport Station Decommissioning Project, completed in 1989, as well as from the decommissioning planning and engineering for the Big Rock Point, Connecticut Yankee, Crystal River, Gentilly-2, Humboldt Bay-3, Maine Yankee, Pathfinder, Rancho Seco, Shoreham, Trojan, Yankee Rowe, Oyster Creek, San Onofre-1, Vermont Yankee, Pilgrim, and Indian Point is reflected within this estimate.

An activity duration critical path is used to determine the total decommissioning program schedule required for calculating the carrying costs, which include program management, administration, field engineering, equipment rental, quality assurance, and security. This systematic approach for assembling decommissioning estimates has ensured a high degree of confidence in the reliability of the resulting costs, in line with Canadian Standards Association, N294-19, “Decommissioning of facilities containing nuclear substances, 2019”.

Allowance

Consistent with accepted cost estimating practice, allowances are applied to the dismantling costs developed as "specific provision for unforeseeable elements of cost within the defined project scope, particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur.” The cost elements in the estimate are based on ideal conditions; therefore, the types of unforeseeable events that are almost certain to occur in decommissioning, based on industry experience, are addressed through a percentage allowance applied on a line-item basis. This allowance factor is a nearly universal element in all large-scale construction and demolition projects. It should be noted that allowance, as used in this estimate, does not account for price escalation and inflation in the cost of decommissioning over the remaining operating life of the station and subsequent dismantling period.

The use and role of allowances within decommissioning estimates is not a safety factor issue. Safety factors provide additional security and address situations that may never occur. Allowance funds, by contrast, are expected to be fully expended throughout the program. Inclusion of allowance is necessary to provide assurance that sufficient funding will be available to accomplish the intended tasks.

Site Restoration

Site restoration, which includes the conventional demolition of “clean” structures, will occur promptly after a systems and components dismantling period. This cost estimate assumes that site structures within the restricted access area are removed to a nominal depth of one meter below the local grade level wherever possible. The site is then graded and stabilized.

Summary

This study provides an estimate for a conventional dismantling of DNNP under current requirements and is based on present-day costs and available technology. Tables in the report summarize the dismantling costs by category and organized by Work Breakdown Structure (WBS) element. The categories as used in the summary table include:

- Removal – The cost of removing systems and structures.
- Project Management – The cost associated with managing and supporting the decommissioning work activities.
- Other – Those costs not directly associated with the cost categories described above, including – environmental assessments, energy, taxes, fees, insurance, overheads, etc.
- Allowance – The cost allocated to project allowance. This cost is applied to each WBS element and varies by element.
- Risk Contingency – In order to account for the costs associated with dismantling circumstances not included within specific WBS elements of the estimate, a risk contingency has been applied to the estimate total cost including allowance. The contingency is included to address problems that are likely to occur beyond the project scope (i.e., unknown unknowns).

This cost analysis is designed to provide OPG with sufficient information to assess its financial obligations, as they pertain to the conventional dismantling of DNNP prior to the first fuel load.

SUMMARY OF N-REP-00962.2-00003 R000

DECOMMISSIONING COST STUDY FOR THE DARLINGTON NEW NUCLEAR PROJECT – END OF LIFE

This cost estimate evaluates the decommissioning of the Darlington New Nuclear Project (DNNP) following the cessation of plant operations at the end of life. The cost is based on several key assumptions, including regulatory requirements, estimating methodology, allowance requirements, low and intermediate-level radioactive waste, disposal site availability for radioactive waste management, and site restoration requirements.

Regulations

Guidance on nuclear station decommissioning preparation and planning in Canada is found in Regulatory Document REGDOC-2.11.2, "Decommissioning," promulgated by the Canadian Nuclear Safety Commission (CNSC). This regulatory document requires licensees to prepare a Preliminary Decommissioning Plan (PDP) and submit it to the CNSC for acceptance with an application for a licence in respect of a nuclear facility or the conduct of a licensed activity, in accordance with the conditions of its licence. The PDP shall document the selected decommissioning strategy; main decontamination, dismantling and/or clean-up activities; end-state objectives; an overview of the principal hazards and protection strategies; a waste management strategy; a cost estimate; and financial guarantee arrangements. Regulatory Document REGDOC 3.3.1, "Financial Guarantees for Decommissioning of Nuclear Facilities and Termination of Licensed Activities," provides guidance on developing a cost estimate to ensure there will be sufficient resources to safely decommission the station in accordance with the decommissioning plan.

The objectives described above provide a framework that is similar in philosophy to the U.S. Nuclear Regulatory Commission's position on decommissioning: that adequate funds be collected over the operating life of a nuclear facility, such that, at the end of its useful life, the facility may be removed from service safely, without endangering the health and welfare of the public. The basic intent of this requirement is the same for both Canada and the U.S.: that the estimates for performing this future work be reviewed and updated periodically to capture economic trends, technical advances in the performance of any field-related activities that would affect final decontamination and dismantling of a facility, and changes in facility configuration or conditions.

The CNSC permits a graded approach to decommissioning throughout the operating life of the reactor. This conceptual approach is intended to be refined over the operating life of the station, with changes approved by the CNSC. The implication is that the decommissioning plan will be continually maintained and updated to reflect current financial and operating conditions at the facility. Furthermore, the current CNSC regulatory guidance sets forth requirements for a

detailed decommissioning plan (DDP), as approved by the CNSC prior to the start of dismantling activities.

This cost estimate addresses all activities necessary to comply with CNSC REGDOC 2.11.2 “Decommissioning” as well as CSA N294-19, “Decommissioning of Facilities Containing Nuclear Substances,” for preliminary planning purposes.

Methodology

The methodology used to develop the decommissioning cost estimate follows the basic approach originally presented in the cost estimating guidelines developed by the Atomic Industrial Forum (now Nuclear Energy Institute). This reference describes a unit cost factor method for estimating decommissioning activity costs. The unit cost factors used in this cost estimate reflect site-specific costs and the latest available information about worker productivity in decommissioning. The experience gained in the Shippingport Station Decommissioning Project, completed in 1989, as well as from the decommissioning planning and engineering for Big Rock Point, Connecticut Yankee, Crystal River, Gentilly-2, Humboldt Bay-3, Maine Yankee, Pathfinder, Rancho Seco, Shoreham, Trojan, Yankee Rowe, Oyster Creek, San Onofre-1, Vermont Yankee, Pilgrim, and Indian Point is reflected within this estimate.

An activity duration critical path is used to determine the total decommissioning program schedule required for calculating the carrying costs, which include program management, administration, field engineering, equipment rental, quality assurance, and security. This systematic approach for assembling decommissioning estimates has ensured a high degree of confidence in the reliability of the resulting costs, in line with N294-19 requirements.

Allowance

Consistent with accepted cost estimating practice, allowances are applied to the decontamination and dismantling costs developed as "specific provision for unforeseeable elements of cost within the defined project scope, particularly important where previous experience relating estimates and actual costs has shown that unforeseeable events which will increase costs are likely to occur.” The cost elements in the estimate are based on ideal conditions; therefore, the types of unforeseeable events that are almost certain to occur in decommissioning, based on industry experience, are addressed through a percentage allowance applied on a line-item basis. This allowance factor is a nearly universal element in all large-scale construction and demolition projects. It should be noted that allowance, as used in this estimate, does not account for price escalation and inflation in the cost of decommissioning over the remaining operating life of the station.

The use and role of allowances within decommissioning estimates is not a safety factor issue. Safety factors provide additional security and address situations that may never occur. Allowance funds, by contrast, are expected to be fully expended throughout the program. Inclusion of

allowance is necessary to provide assurance that sufficient funding will be available to accomplish the intended tasks.

Low- and Intermediate-Level Radioactive Waste Disposal

The contaminated and activated material generated in the decontamination and dismantling of a commercial nuclear reactor is classified as low and/or intermediate level radioactive waste (LLW and ILW). OPG has developed disposal charges for both classifications of waste based on disposing of these products at OPG's proposed LLW and ILW Waste Disposal Facilities. The cost of the disposal of the waste generated in decommissioning the DNNP station is estimated using these rates.

High-Level Radioactive Waste

The disposition of high-level radioactive waste is limited to the transfer of the final used fuel generated in the reactor core to the spent fuel pool as a decommissioning expense after permanent cessation of operations. Other used fuel management costs are not considered in this estimate and are accounted for separately by OPG.

Site Restoration

Site restoration, which includes the demolition of "clean" structures, will occur promptly after radioactive material has been removed from the station and the site meets the radiological release criteria.

Consequently, this cost estimate assumes that site structures within the restricted access area are removed to a nominal depth of one meter below the local grade level wherever possible. The site is then graded and stabilized.

Summary

This study provides an estimate for decommissioning DNNP under current requirements and is based on present-day costs and available technology. Tables in this report summarize the decommissioning costs by category, organized by Work Breakdown Structure (WBS) element. The categories as used in the summary table include:

- Decontamination – The cost of decontaminating systems and structures.
- Removal – The cost of removing systems and structures.
- Packaging – The cost of packaging contaminated material for disposal.
- LLW and ILW Transportation and Disposal – The cost of transporting and disposing of contaminated material.
- Project Management– The labour cost associated with managing and supporting the decommissioning work activities.

- LLW Disposal Facility and ILW Disposal Facilities – decommissioning-related costs associated with capital expenditures.
- Other – Those costs not directly associated with the cost categories described above, including – environmental assessments, energy, taxes, fees, insurance, overheads, etc.
- Allowance – The cost allocated to project allowance. This cost is applied to each WBS element and varies by element.
- Risk Contingency – In order to account for the costs associated with decommissioning circumstances not included within specific WBS elements of the estimate, a risk contingency has been applied to the estimate total cost including allowance. The contingency is included to address problems that are likely to occur beyond the project scope (i.e., unknown unknowns).

This cost analysis is designed to provide OPG with sufficient information to assess its financial obligations, as they pertain to the eventual decommissioning of DNNP.

Attachment 1

Summary to Documentary Information Summary DNNP Licence to Construct CNSC Financial Guarantee - NK054-REP-00531-10004-R001

Ontario Power Generation Inc. ("OPG") is required to have in place a financial guarantee acceptable to the Canadian Nuclear Safety Commission ("CNSC") in support of the Darlington New Nuclear Project ("DNNP") requested Licence to Construct ("LTC") ("LTC CNSC Financial Guarantee"). This Documentary Information Summary ("DIS") report summarizes OPG's proposed financial guarantee to meet this requirement.

The LTC CNSC Financial Guarantee requirements ("LTC CNSC Requirement") are based on the cost estimates to decommission the as-built DNNP facility in corresponding escalated dollars and are considered separately from the consolidated financial guarantee in place in accordance with the licence conditions on the operating licences of OPG's existing nuclear facilities, as most recently accepted [R-1] by the CNSC for the period from January 1, 2023 to December 31, 2027 ("2023-2027 CNSC Financial Guarantee").

It is proposed that the LTC CNSC Requirements over the five-year financial guarantee period from 2025 to 2029 to support the requested Licence to Construct be satisfied by a Letter of Credit instrument ("LOC") provided by OPG by December 31, 2024. If any work is advanced on the schedule that would require remediation and decommissioning activities per the associated Preliminary Decommissioning Plan ("PDP") prior to 2025, OPG will inform the CNSC, reassess the LTC CNSC Requirement and advance the timing of the LOC or another acceptable instrument accordingly.

For the period post-2029, OPG will provide CNSC with an updated assessment of the financial guarantee in 2029 or before the CNSC Hearing for DNNP Power Reactor Operating Licence ("PROL"), whichever is earlier.

[R-1] CNSC Letter "Record of Decision – Application for Acceptance of Ontario Power Generation's Revised Consolidated Financial Guarantee", December 6, 2022, e-Doc PDF: 6930798, CD# N-CORR-00531-23514